

CLAIMS

1. A method of forming a dielectric filler-containing polyimide coating on a metallic material through an electrodeposition coating method with the use
5 of a dielectric filler-containing polyimide electrodeposition solution, said solution being a polyimide electrodeposition solution in which a dielectric filler has been contained,

wherein the used as a dielectric filler is a globoid dielectric powder having perovskite structure which is 0.05 to 1.0 μm in an average particle size
10 D_{1A} , 0.1 to 2.0 μm in a weight cumulative particle size D_{50} based on a laser diffraction scattering particle size distribution measurement method, and 4.5 or less in a coagulation degree value represented by D_{50}/D_{1A} where the weight cumulative particle size D_{50} and the average particle size D_{1A} obtained from an image analysis.

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2. A method of forming a dielectric filler-containing polyimide coating on a metallic material through an electrodeposition coating method with the use of a dielectric filler-containing polyimide electrodeposition solution, said solution being a polyimide electrodeposition solution in which a dielectric
20 filler has been contained,

wherein the method comprising the steps of:

forming on a copper material a metallic seed layer of either nickel or cobalt; and

25 forming on a surface of said copper material a dielectric filler-containing polyimide coating through an electrodeposition coating method with the use of a dielectric filler-containing polyimide electrodeposition solution, said solution containing a dielectric powder as a dielectric filler, said dielectric powder having perovskite structure which is 0.05 to 1.0 μm in an

average particle size D_{IA} , 0.1 to 2.0 μm in a weight cumulative particle size D_{50} based on a laser diffraction scattering particle size distribution measurement method, and 4.5 or less in a coagulation degree value represented by D_{50}/D_{IA} where the weight cumulative particle size D_{50} and the 5 average particle size D_{IA} obtained from an image analysis.

3. A method of forming a dielectric filler-containing polyimide coating on a metallic material according to claim 1 or 2, wherein a content of the dielectric filler in the dielectric filler-containing polyimide electrodeposition 10 solution is 50g/L to 350g/L.

4. A method of forming a dielectric filler-containing polyimide coating on a metallic material according to any of claims 1 to 3, wherein the dielectric filler is either calcined barium titanate or uncalcined barium titanate.

15 5. A method of forming a dielectric filler-containing polyimide coating on a metallic material according to any of claims 1 to 4, wherein the dielectric filler is a barium titanate having either a cubic crystal structure only or a crystal structure of a mixed state between a cubic crystal structure and a 20 tetragonal crystal structure.

25 6. A method of manufacturing a copper clad laminate for forming a capacitor layer for use in a printed wiring board, said copper clad laminate having a layered structure consisting of a first copper foil, a dielectric filler-containing polyimide dielectric layer, and a second copper foil, comprising the steps of:

employing a copper foil having a dielectric filler-containing polyimide coating and a copper foil having a polyimide thin film being a polyimide thin

film formed on one side of said second copper foil, said dielectric filler-containing polyimide coating having a dielectric filler-containing polyimide coating formed on a surface of said first copper foil through an electrodeposition coating method with the use of a dielectric filler-containing 5 polyimide electrodeposition solution, said dielectric filler-containing polyimide electrodeposition solution being prepared through mixing a polyimide electrodeposition solution and a dielectric powder, as a dielectric filler, having a perovskite structure which is 0.05 to 1.0 μm in an average particle size $D_{1\text{A}}$, 0.1 to 2.0 μm in a weight cumulative particle size D_{50} based 10 on a laser diffraction scattering particle size distribution measurement method, and 4.5 or less in a coagulation degree value represented by $D_{50}/D_{1\text{A}}$ where the weight cumulative particle size D_{50} and the average particle size $D_{1\text{A}}$ obtained from an image analysis; and

laminating a surface of the dielectric filler-containing polyimide coating 15 of said copper foil having a dielectric filler-containing polyimide coating and a surface of the polyimide thin film of said copper foil having a polyimide thin film in a manner that both the surfaces come into contact with each other.

7. A method of manufacturing a copper clad laminate for forming a 20 capacitor layer for use in a printed wiring board, said copper clad laminate having a layered structure consisting of a first copper foil, a dielectric filler-containing polyimide dielectric layer, and a second copper foil, comprising the steps of:

25 forming a metallic seed layer of either nickel or cobalt on a surface of a first copper foil;

employing a copper foil having a dielectric filler-containing polyimide coating and a copper foil having a polyimide thin film being a polyimide thin film formed on one side of said second copper foil, said dielectric filler-

containing polyimide coating having a dielectric filler-containing polyimide coating formed on a surface of said metal seed layer through an electrodeposition coating method with the use of a dielectric filler-containing polyimide electrodeposition solution, said dielectric filler-containing

5 polyimide electrodeposition solution being prepared through mixing a polyimide electrodeposition solution and a dielectric powder, as a dielectric filler, having a perovskite structure which is 0.05 to 1.0 μm in an average particle size $D_{1\text{A}}$, 0.1 to 2.0 μm in a weight cumulative particle size D_{50} based on a laser diffraction scattering particle size distribution measurement method,

10 and 4.5 or less in a coagulation degree value represented by $D_{50}/D_{1\text{A}}$ where the weight cumulative particle size D_{50} and the average particle size $D_{1\text{A}}$ obtained from an image analysis; and

laminating a surface of the dielectric filler-containing polyimide coating of said copper foil having a dielectric filler-containing polyimide coating and a

15 surface of the polyimide thin film of said copper foil having a polyimide thin film in a manner that both the surfaces come into contact with each other.

8. A method of forming a copper clad laminate for forming a capacitor layer for use in a printed wiring board according to claim 6 or 7, wherein a

20 content of the dielectric filler in the dielectric filler-containing polyimide electrodeposition solution is 50g/L to 350g/L.

9. A method of forming a copper clad laminate for forming a capacitor layer for use in a printed wiring board according to any of claims 6 to 8,

25 wherein the dielectric filler is either calcined barium titanate or uncalcined barium titanate.

10. A method of forming a copper clad laminate for forming a capacitor layer for use in a printed wiring board according to any of claims 6 to 9, wherein the dielectric filler is a barium titanate having either a cubic crystal structure only or a crystal structure of a mixed state between a cubic crystal structure and a tetragonal crystal structure.

11. A copper clad laminate for forming a capacitor layer for use in a printed wiring board as obtained through the methods of forming a copper clad laminate for forming a capacitor layer for use in a printed wiring board according to claims 6 to 10.